RFEXPOSURE

EXEMPTREPORT

APPLICANT	:	Orbbec Inc.
PRODUCT NAME	:	Wireless Bridge
MODEL NAME	:	WBF1
BRAND NAME	:	ORBBEC
FCC ID	:	2A2CLWBF1
STANDARD(S)	:	47 CFR Part 2(2.1093)
RECEIPT DATE	:	2023-08-28
TEST DATE	:	2023-09-05 to 2023-09-27
ISSUE DATE	:	2023-09-27

Edited by: Su xiaoxian

Su Xiaoxian (Rapporteur)

Approved by: Shen Junsheng

Shen Junsheng (Supervisor)

DIRECTORY

Change History		
Version	**Date**	**Reason for change**
1.0	2023-09-22	First edition
2.0	2023-09-27	Update hardware/software version, Product/ Model Name, Antenna gain and replaced the report version 1.0.

1. Technical Information

Note: Provide by applicant.

1.1 Applicant and Manufacturer Information

Applicant:	Orbbec Inc.
Applicant Address:	12/F, Hi-Tech Zone Union Headquarters Building, No.63 Xuefu Road, Nanshan District, Shenzhen, Guangdong P. R. China
Manufacturer:	Orbbec Inc.
Manufacturer Address:	12/F, Hi-Tech Zone Union Headquarters Building, No.63 Xuefu Road, Nanshan District, Shenzhen, Guangdong P. R. China

1.2 Equipment Under Test (EUT) Description

Product Name:	Wireless Bridge	
Sample No.:	42#	
Hardware Version:	V1.1	
Software Version:	V1.1.5	
Frequency Bands:	WLAN 5GHz	5180MHz-5240MHz
		5725MHz-5825MHz
Modulation Type：	WLAN 5GHz	OFDM, OFDMA
Antenna Type:	PCB Antenna	
Antenna Gain:	ANT 1: 1.8dBi; ANT 2: 2.89dBi	

1.3 Applied Reference Documents

Leading reference documents for testing:

Identity	Document Title	Method Determination /Remark
47 CFR Part 2(2.1093)	Radio Frequency Radiation Exposure Assessment: Portable devices	No deviation
KDB 447498 D01v06	General RF Exposure Guidance	No deviation
Note 1: Additions to, deviation, or exclusions from the method shall be judged in the"method determination" column of add, deviate or exclude from the specific method shall be explained in the "Remark" of the above table. **Note 2:**When the test result is a critical value, we will use the measurement uncertainty give the judgment result based on the 95% confidence intervals.		

2. Device Category and RF Exposure Limit

Per user manual, based on 47 CFR 2.1093, this device belongs to portable device category with General Population/Uncontrolled exposure.

Portable Devices:

47 CFR 2.1093(b)

For purposes of this section, a portable device is defined as a transmitting device designed to be used so that the radiating structure(s) of the device is/are within 20 centimeters of the body of the user.

General Population/Uncontrolled Exposure:

47 CFR 2.1093(d) (2)

Limits for General Population/Uncontrolled exposure: 0.08 W/kg as averaged over the whole-body and spatial peak SAR not exceeding 1.6 W/kg as averaged over any 1 gram of tissue (defined as a tissue volume in the shape of a cube). Exceptions are the hands, wrists, feet and ankles where the spatial peak SAR shall not exceed 4 W/kg, as averaged over any 10 grams of tissue (defined as a tissue volume in the shape of a cube). General Population/Uncontrolled limits apply when the general public may be exposed, or when persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or do not exercise control over their exposure. Warning labels placed on consumer devices such as cellular telephones will not be sufficient reason to allow these devices to be evaluated subject to limits for occupational/controlled exposure in paragraph (d)(1) of this section.

3. RF Output Power

WLAN 5GHz, ANT1					
Mode	Frequency (MHz)	Antenna	Total Conducted Power (dBm)	Tune-up Power	Duty Cycle (%)
a	5180	Ant1	11.49	11.50	96.14
a	5220	Ant1	11.81	12.00	96.01
a	5240	Ant1	11.4	11.50	96.01
a	5745	Ant1	11.19	11.50	96.01
a	5785	Ant1	11.48	11.50	96.14
a	5825	Ant1	10.65	11.00	96.01
n20	5180	Ant1	11.6	12.00	95.89
n20	5220	Ant1	11.68	12.00	95.75
n20	5240	Ant1	11.32	11.50	95.75
n20	5745	Ant1	10.09	10.50	95.75
n20	5785	Ant1	10.46	10.50	95.89
n20	5825	Ant1	8.96	9.00	95.75
n40	5190	Ant1	11.65	12.00	91.78
n40	5230	Ant1	11.49	11.50	92.05
n40	5755	Ant1	10.96	11.00	92.05
n40	5795	Ant1	10.48	10.50	92.05
ac20	5180	Ant1	11.51	12.00	89.55
ac20	5220	Ant1	11.78	12.00	89.55
ac20	5240	Ant1	11.38	11.50	89.22
ac20	5745	Ant1	10.23	10.50	89.22
ac20	5785	Ant1	10.49	10.50	89.55
ac20	5825	Ant1	8.96	9.00	89.55
ac40	5190	Ant1	11.59	12.00	92.13
ac40	5230	Ant1	11.46	11.50	91.88
ac40	5755	Ant1	10.95	11.00	91.88
ac40	5795	Ant1	10.45	10.50	92.13
ac80	5210	Ant1	11.31	11.50	77.05
ac80	5775	Ant1	9.74	10.00	77.05
ax20	5180	Ant1	11.69	12.00	88.48
ax20	5220	Ant1	**11.88**	12.00	88.07
ax20	5240	Ant1	11.54	12.00	88.07
ax20	5745	Ant1	10.43	10.50	88.07
ax20	5785	Ant1	10.51	11.00	88.07

ax20	5825	Ant1	9.2	9.50	88.48
ax40	5190	Ant1	11.77	12.00	84.78
ax40	5230	Ant1	11.7	12.00	84.32
ax40	5755	Ant1	10.86	11.00	84.32
ax40	5795	Ant1	10.5	11.00	84.32
ax80	5210	Ant1	11.25	11.50	76.8
ax80	5775	Ant1	10.56	11.00	87.61

WLAN 5GHz, ANT2					
Mode	Frequency (MHz)	Antenna	Total Conducted Power (dBm)	Tune-up Power	Duty Cycle (%)
a	5180	Ant2	11.66	12.00	96.01
a	5220	Ant2	11.74	12.00	96.14
a	5240	Ant2	11.66	12.00	96.15
a	5745	Ant2	11.24	11.50	96.14
a	5785	Ant2	11.66	12.00	96.01
a	5825	Ant2	10.77	11.00	96.01
n20	5180	Ant2	11.02	11.50	95.75
n20	5220	Ant2	11.03	11.50	95.89
n20	5240	Ant2	10.96	11.00	95.89
n20	5745	Ant2	10.62	11.00	95.89
n20	5785	Ant2	10.79	11.00	95.75
n20	5825	Ant2	9.79	10.00	95.89
n40	5190	Ant2	11.68	12.00	91.78
n40	5230	Ant2	11.58	12.00	91.78
n40	5755	Ant2	11.15	11.50	91.78
n40	5795	Ant2	10.66	11.00	91.78
ac20	5180	Ant2	11.59	12.00	89.55
ac20	5220	Ant2	11.68	12.00	89.22
ac20	5240	Ant2	11.59	12.00	89.55
ac20	5745	Ant2	10.83	11.00	89.22
ac20	5785	Ant2	11.05	11.50	89.55
ac20	5825	Ant2	10.12	10.50	89.55
ac40	5190	Ant2	11.62	12.00	91.88
ac40	5230	Ant2	11.54	12.00	92.13
ac40	5755	Ant2	11.15	11.50	92.13
ac40	5795	Ant2	10.69	11.00	91.88
ac80	5210	Ant2	11	11.50	85.26

ac80	5775	Ant2	10.22	10.50	85.26
ax20	5180	Ant2	11.76	12.00	88.07
ax20	5220	Ant2	**11.84**	12.00	88.48
ax20	5240	Ant2	11.81	12.00	88.48
ax20	5745	Ant2	10.96	11.00	88.48
ax20	5785	Ant2	11.2	11.50	88.48
ax20	5825	Ant2	10.36	10.50	88.48
ax40	5190	Ant2	11.83	12.00	84.78
ax40	5230	Ant2	11.79	12.00	84.78
ax40	5755	Ant2	11.23	11.50	84.78
ax40	5795	Ant2	10.95	11.00	84.32
ax80	5210	Ant2	11.25	11.50	83.62
ax80	5775	Ant2	10.65	11.00	83.62

WLAN 5GHz, ANT1+2					
Mode	Frequency (MHz)	Antenna	Total Conducted Power (dBm)	Tune-up Power	Duty Cycle (%)
n20	5180	Ant1	7.69	8.00	92.1
n20	5180	Ant2	8.35	8.50	92.35
n20	5180	Sum	11.04	11.50	92.1
n20	5220	Ant1	8.06	8.50	92.1
n20	5220	Ant2	8.54	9.00	92.1
n20	5220	Sum	11.32	11.50	92.35
n20	5240	Ant1	7.67	8.00	86.14
n20	5240	Ant2	8.31	8.50	86.14
n20	5240	Sum	11.01	11.50	86.14
n20	5745	Ant1	7.71	8.00	85.71
n20	5745	Ant2	8.58	9.00	92.43
n20	5745	Sum	11.18	11.50	92.43
n20	5785	Ant1	8.19	8.50	92.18
n20	5785	Ant2	9.07	9.50	92.43
n20	5785	Sum	11.66	12.00	92.43
n20	5825	Ant1	7.13	7.50	92.43
n20	5825	Ant2	8.15	8.50	85.85
n20	5825	Sum	10.68	11.00	86.27
N40	5190	Ant1	7.71	8.00	85.85
N40	5190	Ant2	8.41	8.50	86.27
N40	5190	Sum	11.09	11.50	76.42

N40	5230	Ant1	7.73	8.00	77.05
N40	5230	Ant2	8.39	8.50	78.46
N40	5230	Sum	11.08	11.50	78.46
N40	5755	Ant1	8.27	8.50	78.46
N40	5755	Ant2	8.91	9.00	78.46
N40	5755	Sum	11.61	12.00	78.46
N40	5795	Ant1	8.21	8.50	78.46
N40	5795	Ant2	8.88	9.00	90.55
N40	5795	Sum	11.57	12.00	90.88
ac20	5180	Ant1	7.9	8.00	90.88
ac20	5180	Ant2	8.38	8.50	90.55
ac20	5180	Sum	11.16	11.50	76.8
ac20	5220	Ant1	8.17	8.50	76.8
ac20	5220	Ant2	8.53	9.00	92.1
ac20	5220	Sum	11.36	11.50	92.35
ac20	5240	Ant1	7.71	8.00	92.1
ac20	5240	Ant2	8.47	8.50	92.1
ac20	5240	Sum	11.12	11.50	92.1
ac20	5745	Ant1	7.67	8.00	92.35
ac20	5745	Ant2	8.52	9.00	86.14
ac20	5745	Sum	11.13	11.50	86.14
ac20	5785	Ant1	8.18	8.50	86.14
ac20	5785	Ant2	9.04	9.50	85.71
ac20	5785	Sum	11.64	12.00	92.43
ac20	5825	Ant1	7.1	7.50	92.43
ac20	5825	Ant2	8.1	8.50	92.18
ac20	5825	Sum	10.64	11.00	92.43
ac40	5190	Ant1	7.9	8.00	92.43
ac40	5190	Ant2	8.5	9.00	92.43
ac40	5190	Sum	11.22	11.50	85.85
ac40	5230	Ant1	7.98	8.00	86.27
ac40	5230	Ant2	8.56	9.00	85.85
ac40	5230	Sum	11.29	11.50	86.27
ac40	5755	Ant1	8.16	8.50	76.42
ac40	5755	Ant2	8.97	9.00	77.05
ac40	5755	Sum	11.59	12.00	78.46
ac40	5795	Ant1	8.11	8.50	78.46
ac40	5795	Ant2	8.94	9.00	78.46

ac40	5795	Sum	11.56	12.00	78.46
ac80	5210	Ant1	6.76	7.00	78.46
ac80	5210	Ant2	7.42	7.50	78.46
ac80	5210	Sum	10.11	10.50	90.55
ac80	5775	Ant1	7.8	8.00	90.88
ac80	5775	Ant2	8.77	9.00	90.88
ac80	5775	Sum	11.32	11.50	90.55
ax20	5180	Ant1	8.03	8.50	76.8
ax20	5180	Ant2	8.64	9.00	76.8
ax20	5180	Sum	11.35	11.50	92.1
ax20	5220	Ant1	8.19	8.50	92.35
ax20	5220	Ant2	8.73	9.00	92.1
ax20	5220	Sum	11.48	11.50	92.1
ax20	5240	Ant1	7.85	8.00	92.1
ax20	5240	Ant2	8.61	9.00	92.35
ax20	5240	Sum	11.26	11.50	86.14
ax20	5745	Ant1	7.96	8.00	86.14
ax20	5745	Ant2	8.66	9.00	86.14
ax20	5745	Sum	11.34	11.50	85.71
ax20	5785	Ant1	8.43	8.50	92.43
ax20	5785	Ant2	9.09	9.50	92.43
ax20	5785	Sum	11.78	12.00	92.18
ax20	5825	Ant1	7.32	7.50	92.43
ax20	5825	Ant2	8.19	8.50	92.43
ax20	5825	Sum	10.79	11.00	92.43
ax40	5190	Ant1	7.97	8.00	85.85
ax40	5190	Ant2	8.53	9.00	86.27
ax40	5190	Sum	11.27	11.50	85.85
ax40	5230	Ant1	7.9	8.00	86.27
ax40	5230	Ant2	8.5	9.00	76.42
ax40	5230	Sum	11.22	11.50	77.05
ax40	5755	Ant1	8.39	8.50	78.46
ax40	5755	Ant2	9.15	9.50	78.46
ax40	5755	Sum	11.8	12.00	78.46
ax40	5795	Ant1	8.34	8.50	78.46
ax40	5795	Ant2	9.35	9.50	78.46
ax40	5795	Sum	**11.88**	12.00	78.46
ax80	5210	Ant1	7.32	7.50	90.55

ax80	5210	Ant2	7.87	8.00	90.88
ax80	5210	Sum	10.61	11.00	90.88
ax80	5775	Ant1	8.11	8.50	90.55
ax80	5775	Ant2	9.03	9.50	76.8
ax80	5775	Sum	11.6	12.00	76.8

Note 1: According to KDB 447498, MPE assessment is based on source-based time-averaged maximum conducted output power of the RF channel requiring assessment, adjusted for tune-up tolerance, and the minimum test separation distance required for the exposure conditions.

Note 2: The output power refers to report (Report No.: SZ23080239W01).

4. RF Exposure Evaluation

➢ **Standalone Transmission SAR Evaluation:**

1. According to KDB 447498 section 4.3.1, the 10-g SAR test exclusion thresholds at test separation Distances≤ 50 mm are determined by:
   [(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)]·[√f(GHz)] ≤ 7.5 for 10g.
   - f(GHz) is the RF channel transmit frequency in GHz
   - Power and distance are rounded to the nearest mW and mm before calculation
   - The result is rounded to one decimal place for comparison

2. When the device is used, 0mm as the most conservative minimum test separation distance was used for evaluating.

Channel	Frequency (GHz)	Max. Tune-up Power (dBm)	Max. Power (mW)	Test Distance (mm)	Result	Exclusion Thresholds for 10-g SAR
CH 44	5.220	12.00	15.85	5	7.24	7.5

Note: The conduction power was rounded in mW.

3. When standalone SAR is not required to be measured, per KDB 447498 D01v06 4.3.2), the following equation must be used to estimate the standalone 10g SAR.

$$\text{Estimated SAR} = \frac{\sqrt{f(GHz)}}{18.75} \cdot \frac{\text{Max. power of channel, mW}}{\text{Min. Separation Distance, mm}}$$

Mode	Max. Tune-up Power (dBm)	Exposure Position	Body
		Test Distance (mm)	5
Bluetooth	12.00	Estimated SAR (W/kg)	0.386

➢ **Simultaneous SAR Evaluation:**

This device only incorporates one WLAN 5GHz transmitter, therefore simultaneous SAR evaluation is not required.

Annex A Testing Laboratory Information

1. Identification of the Responsible Testing Laboratory

Laboratory Name:	Shenzhen Morlab Communications Technology Co., Ltd.
Laboratory Address:	FL.3, Building A, FeiYang Science Park, No.8 LongChang Road, Block 67, BaoAn District, ShenZhen, GuangDong Province, P. R. China
Telephone:	+86 755 36698555
Facsimile:	+86 755 36698525

2. Identification of the Responsible Testing Location

Name:	Shenzhen Morlab Communications Technology Co., Ltd.
Address:	FL.3, Building A, FeiYang Science Park, No.8 LongChang Road, Block 67, BaoAn District, ShenZhen, GuangDong Province, P. R. China

3. Facilities and Accreditations

All measurement facilities used to collect the measurement data are located at FL.3, Building A, FeiYang Science Park, Block 67, BaoAn District, Shenzhen, 518101 P. R. China. The test site is constructed in conformance with the requirements of ANSI C63.10-2013and CISPR Publication 22; the FCC designation number is CN1192, the test firm registration number is 226174.

END OF REPORT